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EXAMINER	
BODDIE, WILLIAM	

ART UNIT	PAPER NUMBER
2629	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/691,312	LEE ET AL.	
	Examiner	Art Unit	
	William Boddie	2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23* is/are rejected.

7)☒ Claim(s) *3,7-9,11-12,17-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10/23/03* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities: throughout the specification the use of 64-bit gray scale levels is used incorrectly. As currently wording it appears that the Applicant is discussing a 64 bit gray scale which would enable 2^{64} levels. Appropriate correction is required.

Drawings

2. The drawings are objected to because of the use of the terminology 64-bit gray scale level. As stated above this is used incorrectly, note figures 5, 6 and 8. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

3. Claim 3 is objected to because of the following informalities: "is the maximum gray scale value". It appears the Applicant intended this to read –is a maximum gray scale value--. Appropriate correction is required.

4. Claim 12 is objected to because of the following informalities: "including the maximum gray scale value". It appears the Applicant intended this to read –including a maximum gray scale value--. Appropriate correction is required.

5. Claim 19 is objected to because of the following informalities: "information to the LCD device". It appears the Applicant intended this to read –information to a LCD device--. Appropriate correction is required.

6. Claim 20 is objected to because of the following informalities: "information to the plurality of data lines". It appears the Applicant intended this to read –information to a plurality of data lines--. Appropriate correction is required.

7. Claims 7-9, 11 and 17-18 are objected to because of the following informalities: the constant referral to 64-bit gray scale levels is not supported by the specification. If indeed the invention used a 64-bit gray scale this would generate 2^{64} levels for each color. It appears the Applicant might have intended 64 gray scale levels, which corresponds to a 6 bit gray scale (2^6=64). These claims will be examined under this assumption. Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1 and 3-7 are rejected under 35 U.S.C. 102(b) as being anticipated by Kimura et al. (US 6,008,786).

With respect to claim 1, Kimura discloses, a liquid crystal display device (fig. 1), comprising:

a liquid crystal display (LCD) panel (1 in fig. 1), the LCD panel including a plurality of gate lines (note lines off of 5 in fig. 1) and a plurality of data lines (note lines off of 3 in fig. 1) crossing the plurality of gate lines, and a plurality of red (R), green (G), and blue (B) pixels arranged in a matrix pattern (col. 1, lines 47-48);

a gate driving unit for applying scan signals to the plurality of gate lines (5 in fig. 1);

a lookup table (33-34 in fig. 5) for storing a gray scale value (addition/subtraction amounts in fig. 7) corresponding to a predetermined grayscale level (left side of fig. 6) of a displayable color (note the correspondence between the addition/subtraction amount and the gray scale level);

a data processing unit for compensating image information according to the stored gray scale value (32 in fig. 5); and

a data driving unit (3 in fig. 1) for receiving the compensated image information and for applying the compensated image information to the data lines.

With respect to claim 3, Kimura discloses, the device of claim 1 (see above), wherein the stored gray scale value is the maximum gray scale value (the stored values shown in fig. 7 are 0,-2 and –4. Out of these options the maximum gray scale value is 0, which is stored in a table (34 in fig. 5)).

With respect to claim 4, Kimura discloses, the device of claim 1 (see above), wherein the displayable color includes a blue color (col. 4, lines 38-44).

With respect to claim 5, Kimura discloses, the device of claim 1 (see above), wherein the displayable color is displayable at a plurality of grayscale levels (a level of 9 and 11 result in an identical value therefore the displayable color corresponding to a blue level of 9 is also displayable at a blue level of 11.).

With respect to claim 6, Kimura discloses, the device of claim 1 (see above), wherein the lookup table stores grayscale values of a blue color (fig. 6-7 and col. 4, lines 38-44).

With respect to claim 7, Kimura discloses, the device of claim 6 (see above), wherein the lookup table stores gray scale values corresponding to 64-bit gray scale level of the blue color (col. 4, lines 38-44; and col. 1, lines 52-56).

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-10 and 12-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of Kimura et al. (US 6,008,786).

With respect to claim 1, Yui discloses, a display device (6 in fig. 1), comprising:

a display panel (6 in fig. 1),

a lookup table (3,9 in fig. 1) for storing a gray scale value (output data in figs. 6a2-c2) corresponding to a predetermined grayscale level (input data in figs. 6a2-6c2) of a displayable color;

a data processing unit for compensating image information according to the stored gray scale value (7 in fig. 1); and

a data driving unit (5 in fig. 1) for receiving the compensated image information and for applying the compensated image information to the display panel.

Yui does not expressly disclose, that the display panel is a LCD panel with the requisite control circuitry.

Kimura discloses, a liquid crystal display (LCD) panel (1 in fig. 1), the LCD panel including a plurality of gate lines (note lines off of 5 in fig. 1) and a plurality of data lines (note lines off of 3 in fig. 1) crossing the plurality of gate lines, and a plurality of red (R), green (G), and blue (B) pixels arranged in a matrix pattern (col. 1, lines 47-48);

a gate driving unit for applying scan signals to the plurality of gate lines (5 in fig. 1).

Kimura and Yui are analogous art because they are both from the same field of endeavor namely gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the display panel of Yui with the LCD panel taught by Kimura.

The motivation for doing so would have been, low power consumption and fast response (Kimura; col. 1, lines 16-20).

Therefore it would have been obvious to combine Yui and Kimura for the benefit of lowered power consumption to obtain the invention as specified in claim 1.

With respect to claim 2, Yui and Kimura disclose, the device of claim 1 (see above).

Yui further discloses, wherein the predetermined gray scale level corresponds to a gray scale level of the displayable color prior to a reduction in a reproducibility of the displayable color (clear from figs. 6a-c; also note col. 4, lines 57-67).

With respect to claim 3, Yui and Kimura disclose, the device of claim 1 (see above).

Yui further discloses, wherein the stored gray scale value is the maximum gray scale value (clear from figs. 6a-c that the stored gray scale value (output data) is the maximum gray scale value).

With respect to claim 4, Yui and Kimura disclose, the device of claim 1 (see above).

Yui further discloses, wherein the displayable color includes a blue color (clear from figs. 6c1-2).

With respect to claim 5, Yui and Kimura disclose, the device of claim 1 (see above).

Yui further discloses, wherein the displayable color is displayable at a plurality of grayscale levels (as a result of the clipping, there is clearly a displayable color that is displayable at a plurality of grayscale levels).

With respect to claim 6, Yui and Kimura disclose, the device of claim 1 (see above).

Yui further discloses, wherein the lookup table stores grayscale values of a blue color (clear from figs. 6c1-2).

With respect to claim 7, Yui and Kimura disclose, the device of claim 6 (see above).

Yui does not expressly disclose the use of a 64-bit gray scale level.

Kimura discloses, a lookup table that stores gray scale values corresponding to 64-bit gray scale level of a blue color (col. 4, lines 38-44; and col. 1, lines 52-56).

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the 256 level gray scale of Yui with the 64 level gray scale of Kimura for the benefit of cost.

With respect to claims 8 and 9, Yui and Kimura disclose, the device of claim 7 (see above).

While Yui discloses a 256 level gray scale instead of a 64 level gray scale, as shown above it would have been obvious to use a 64 level gray scale.

It is clear from figures 6A-2-6C-2 of Yui that once the input gray scale levels reach a certain level (based on the reproducibility of the device), that level is maintained until the maximum gray scale level.

With the conversion of Yui to a 64 level gray scale the clipped portion in figure 6 would likely begin close to a 51st gray scale level. If the color reproducibility required that the gray scale be clipped at the 51st level then the disclosure of Yui could clearly accommodate that.

Furthermore, lacking a definite advantage of freezing grayscale values at the 51st level in the current invention, there does not appear to be any reason for specifically selecting the 51st level versus the 50th or 49th levels. This selection appears to be entirely predicated on at what level the color reproducibility begins to decrease. As Yui discloses adjusting the clipping of the gray scale based on the color reproducibility of the device, Yui is seen as sufficiently anticipating this limitation of claims 8 and 9.

With respect to claim 10, Yui and Kimura disclose, the device of claim 1 (see above).

Yui further discloses, wherein the lookup table stores gray scale values of blue, red and green colors (clear from figs. 6a2-c2).

With respect to claim 12, Yui discloses, a method for improving a color reproducibility (fig. 2) of a display device (6 in fig. 1), comprising:

increasing a gray scale value of at least one of a red (R), green (G), and blue (B) color (clear from differences from fig. 6a1-c1 to fig. 6a2-c2);

detecting a grayscale value at which a color reproducibility of the LCD device is reduced (col. 4, lies 59-67);

storing a gray scale value corresponding to predetermined gray scale level of a displayable color (col. 5, lines 1-5);

compensating a received image information, the received image information including the detected gray scale value (col. 5, lines 5-11); and

applying the compensated image information to data lines of the display device (5 in fig. 1), the compensated image information including the maximum gray scale value.

Yui does not expressly disclose, that the display panel is a LCD panel.

Kimura discloses, a liquid crystal display (LCD) panel (1 in fig. 1), the LCD panel including a plurality of gate lines (note lines off of 5 in fig. 1) and a plurality of data lines (note lines off of 3 in fig. 1) crossing the plurality of gate lines, and a plurality of red (R), green (G), and blue (B) pixels arranged in a matrix pattern (col. 1, lines 47-48).

Kimura and Yui are analogous art because they are both from the same field of endeavor namely gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the display panel of Yui with the LCD panel taught by Kimura.

The motivation for doing so would have been, low power consumption and fast response (Kimura; col. 1, lines 16-20).

Therefore it would have been obvious to combine Yui and Kimura for the benefit of lowered power consumption to obtain the invention as specified in claim 12.

With respect to claim 13, as claim 13 recites identical limitations as claim 2, claim 13 is rejected on the same merits as shown above in claim 2.

With respect to claim 14, as claim 14 recites identical limitations as claim 3, claim 14 is rejected on the same merits as shown above in claim 3.

With respect to claim 15, Yui and Kimura disclose, the method of claim 12 (see above).

Yui further discloses, wherein the detecting includes measuring a gray scale level of a displayable color (col. 4, lines 64-67).

With respect to claim 16, as claim 16 recites identical limitations as claim 4, claim 16 is rejected on the same merits as shown above in claim 4.

With respect to claim 17, as claim 17 recites identical limitations as claim 8, claim 17 is rejected on the same merits as shown above in claim 8.

With respect to claim 18, as claim 18 recites identical limitations as claim 9, claim 18 is rejected on the same merits as shown above in claim 9.

With respect to claim 19, Yui discloses, a method of driving a display device (6 in fig. 1), comprising:

receiving image information (1 in fig. 1), the image information including a gray scale value corresponding to a color displayable by the display device (input data in fig. 6);

determining whether the gray scale value is greater than a predetermined corresponding gray scale level at which the color is displayable by the display panel (col. 2, lines 43-45);

applying the image information to the display device if it is determined the gray scale value is not greater than the predetermined corresponding gray scale level (col. 4, line 59 - col. 5, line 11); and

compensating the image information if it is determined the gray scale value is great than the predetermined corresponding gray scale level (col. 5, lines 5-11).

Yui does not expressly disclose, that the display panel is a LCD panel.

Kimura discloses, a liquid crystal display (LCD) panel (1 in fig. 1), the LCD panel including a plurality of gate lines (note lines off of 5 in fig. 1) and a plurality of data lines (note lines off of 3 in fig. 1) crossing the plurality of gate lines, and a plurality of red (R), green (G), and blue (B) pixels arranged in a matrix pattern (col. 1, lines 47-48).

Kimura and Yui are analogous art because they are both from the same field of endeavor namely gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to replace the display panel of Yui with the LCD panel taught by Kimura.

The motivation for doing so would have been, low power consumption and fast response (Kimura; col. 1, lines 16-20).

Therefore it would have been obvious to combine Yui and Kimura for the benefit of lowered power consumption to obtain the invention as specified in claim 19.

With respect to claim 20, Yui and Kimura disclose, the method of claim 19 (see above).

Kimura further discloses, applying the compensated image information to the plurality of data lines (lines exiting X-driver; 3 in fig. 1).

With respect to claim 21, as claim 21 recites identical limitations as claim 4, claim 21 is rejected on the same merits as shown above in claim 4.

With respect to claim 22, Yui and Kimura disclose, the method of claim 19 (see above).

Yui further discloses, wherein the predetermined corresponding gray scale level corresponds to a gray scale level of the color displayable by the display device, wherein the color is displayable by the display device, wherein the color is displayable at a reduced color reproducibility (col. 4, lines 64-67).

12. Claims 11 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yui (US 5,677,741) in view of Kimura et al. (US 6,008,786) and further in view of D'Souza et al. (US 7,046,255)

With respect to claim 11, Yui and Kimura disclose, the device of claim 10 (see above).

Yui further discloses, storing gray scale values of the 52nd to the 64th gray scale (col. 5, lines 1-5) level in the lookup table (3,9 in fig. 1).

Neither Yui nor Kimura expressly disclose, mixing gray scale values of at least two of R, G, and B colors.

D'Souza discloses, mixing gray scale values of two colors (508 in fig. 5; specifically note the formerly solid blue (in 502) that now contains grayscale values for red in addition to the blue values, for certain blue colors.).

D'Souza, Yui and Kimura are analogous because they are all from the same field of endeavor namely, gray scale optimization within display panels.

At the time of the invention it would have been obvious to one of ordinary skill in the art to mix gray scale values of at least two colors, as taught by D'Souza in the clipped gray scale device of Yui and Kimura.

The motivation for doing so would have been, to more accurately display colors, in a more cost effective way than using sRGB monitors (D'Souza; col. 2, lines 4-15).

Therefore it would have been obvious to combine D'Souza with Yui and Kimura for the benefit of accurate color display to obtain the invention as specified in claim 11.

With respect to claim 23, as claim 23 recites identical limitations as claim 11, claim 23 is rejected on the same merits as shown above in claim 11.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Greene et al. (US 6,188,454) discloses, adjusting gray scales due to cell gap variations in liquid crystal displays.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William Boddie whose telephone number is (571) 272-0666. The examiner can normally be reached on Monday through Friday, 7:30 - 4:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amr Awad can be reached on (571) 272-7764. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Wlb
6/22/06

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